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技術表示箇所

301 J 9141-3L

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【特許請求の範囲】

【請求項1】 略U字状の熱交換媒体通路を有するチューブエレメントをフィンを介して複数段積層し、その積層されたチューブエレメントの一端側に熱交換媒体を供給する別体のタンクを接続して成る熱交換器であって、前記タンクは、チューブエレメントの出入口を挿入するエンドプレート面とタンク内部を仕切る仕切部が一体成形される一部材構成のタンク部材と、該タンク部材の開口部を閉塞するキャップとにより構成され、前記仕切部の端部に対応するタンクのエンドプレート面の所定位置に該仕切部の端部を挿入し、ろう接する凹部を設けたことを特徴とする熱交換器。

【発明の詳細な説明】

【0001】

【産業上の利用分野】この発明は、主に車両用空調装置に用いられる熱交換器に関する。

【0002】

【従来の技術】近年の熱交換器は、例えば実開昭63-154962号公報に示されているように、タンクの小型化を図って、タンクを別体に設けて成るものが主流となってきた。

【0003】上記先行技術にかかるタンクは、チューブエレメントの出入口を挿入するエンドプレートと、出入口パイプを有するタンク部材とを接合して構成されるものであり、その接合は、タンク部材の各端部（タンク内部を仕切る仕切部の端部を含む）をエンドプレートに設けた凹部に挿入し、ろう付け固定するものであった。

【0004】

【発明が解決しようとする課題】しかしながら、上記先行技術に係るタンクは、タンク部材とエンドプレートとの接合部分が多く、このため、各接合部分においてろう付け不良が起り易く、タンクの洩れが発生し易いという不具合を有していた。

【0005】そこで、この発明は上記問題点に鑑み、タンクの接合部分（ろう接箇所）を極力最小限となるようにタンクを構成し、タンクの洩れを十分に防止できるように図った熱交換器を提供することを目的とする。

【0006】

【課題を解決するための手段】上記目的を達成するために、この発明に係る熱交換器は、略U字状の熱交換媒体通路を有するチューブエレメントをフィンを介して複数段積層し、その積層されたチューブエレメントの一端側に熱交換媒体を供給する別体のタンクを接続して成る熱交換器であって、前記タンクは、チューブエレメントの出入口を挿入するエンドプレート面とタンク内部を仕切る仕切部が一体成形される一部材構成のタンク部材と、該タンク部材の開口部を閉塞するキャップとにより構成され、前記仕切部の端部に対応するタンクの所定位置に該仕切部の端部を挿入し、ろう接する凹部を設けたものである。

【0007】

【作用】したがって、タンク部材をエンドプレート面を含む一部材により構成し、該タンク部材のろう接箇所を一体成形された仕切部の端部のみとし、これを挿入する凹部をタンクの所定位置に設けてろう接するものであるから、接合部分が最小限に抑えられてろう付け不良の発生率が大幅に低減され、これにより上記課題が解決されるものである。

【0008】

【実施例】以下、この発明の実施例を図面により説明する。

【0009】図1乃至図3において、熱交換器は、チューブエレメント1とコルゲート状のフィン2とを交互に複数段積層し、積層されたチューブエレメント1の出入口側を出入口パイプ3、3を有するタンク部材4に挿入固定すると共に、該タンク部材4の両端の開口部をキャップ5、5で塞いで該キャップ5、5とタンク部材4とでタンク6を構成し、組付られている。

【0010】チューブエレメント1は、例えば下記する2枚の成形プレート10を最中合わせに接合して構成されるもの（所謂ラミネートタイプのもの）である。なお、これに限らず、押し出し成形したものや、パイプを扁平状にした扁平チューブであっても良い。

【0011】前記チューブエレメント1を構成する成形プレート10は、図2に示すように略矩形形状のもので、その一端側に熱交換媒体の出入口部構成用凹部11、12が突出及び膨出形成されていると共に、該出入口部構成用凹部11、12の間から他端側に向けて突条13が延設され、この突条13の周縁に前記出入口部構成用凹部11、12に通じる略U字状の熱交換媒体通路構成用凹部14が膨出形成されている。また、この成形プレート10の他端側にはチューブエレメント突当部15が外方に向けてほぼ直角に山折形成されている。

【0012】この成形プレート10を2枚最中合わせに接合することでチューブエレメント1が構成され、その一端側では相対する出入口部構成用凹部11、12から熱交換媒体の出入口20、21が構成され、その内部では相対する熱交換媒体通路構成用凹部14から略U字状の熱交換媒体通路22が構成されると共に、前記出入口20、21は熱交換媒体通路22を介して連通するようになっている。

【0013】かかる構造のチューブエレメント1は、図1に示すように隣接するチューブエレメント間で各チューブエレメント突当部15を当接させて複数段積層され、積層された各チューブエレメント間及び積層方向両端のチューブエレメントの熱交換面にフィン2を配するようになっている。そしてこの積層されたチューブエレメント1の各出入口20、21は、下記するタンク部材4のチューブエレメント挿入部25、26に挿入固定されるようになっている。

【0014】タンク部材4は、チューブエレメントの積層方向に延びる箱状のもので、例えば図4及び図5に示されるように、1枚のアルミニウム合金板をプレス成形して構成される。このタンク部材4は、チューブエレメント1の出入口20、21を挿入するチューブエレメント挿入部25、26を複数穿設したエンドプレート面27と、タンク側面28、28と、出入口パイプ3、3を挿入するためのパイプ挿入孔29、29が形成されたタンク上面30、30と、タンク6内部を仕切る仕切部35を構成する仕切面31、31とを有し、各面を内側にそれぞれ略直角に曲折して構成される。そして当接された仕切面31、31は、タンク6内部を入口タンク（又は出口タンク）33と、出口タンク（又は入口タンク）34とに仕切る仕切部35を構成すると共に、該仕切部35の先端部は、エンドプレート面27に形成された凹部36に挿入固定されるようになっている（図6参照）。なお、この実施例においては、エンドプレート面27の凹部36の所定位置に切欠38を穿設し、この切欠38の内部に、仕切面31、31の先端に突出形成した係合片39、39を挿入し、この係合片39、39を図7に示すように外側に曲折させ、これにより仕切部35の先端が凹部36内に確実に係合挿入される構造としている。このタンク部材4の両端の開口部は下記するキャップ5、5により閉塞されるようになっており、該タンク部材4とキャップ5、5とでタンク6が構成される。

【0015】キャップ5、5は、タンク6の両端の開口部を閉塞するためのもので、タンク部材4の両端に被せて装着されるようになっている。そしてこのキャップ5、5の上部略中央には、タンク部材4の仕切部35の接合面上部の隙間を埋めるための突起40が内側に向けて突出形成されていると共に、下部略中央には、タンク部材4の凹部36を挿入するための凹部収納部41が設けられている。

【0016】尚、タンク部材4のパイプ挿入孔29、29には、出入口パイプ3、3が挿入固定され、該出入口パイプ3、3は、それぞれタンク6の入口タンク33及び出口タンク34に連通されるようになっている。

【0017】かかる構成の熱交換器は、その構成部材である例えば成形プレート、タンク部材及びキャップ等がアルミニウムを主材料とするアルミニウム合金板の外側にろう材がクラッドされたクラッド材で製造され、治具で固定されて炉中でろう付けされ、組付られる。そしてこの熱交換器は、一方の出入口パイプ3から入口タンク33に流入された熱交換媒体が、各チューブエレメント1の熱交換媒体通路22内を流れ、その間外部の空気との間で熱交換をなし、出口タンク34に集められ、他方の出入口パイプ3から排出される（又は、逆の経路を辿る）ようになっている。

【0018】しかるに、この熱交換器のタンク6は、そ

の構成部材を一部材構成のタンク部材4と、その開口部を塞ぐキャップ5、5とのみにより構成しており、該タンク部材4のろう接箇所を仕切部35の先端部のみとし、この仕切部35の先端部をエンドプレート面27に形成の凹部36内に挿入してろう付け固定を行なうものであるから、ろう接部分が最小限であり、タンク6のろう接不良を最大限に防止することができるようになってい。これにより、ろう接不良の発生率を最小限に抑えることができるから、良品の生産性が極めて大幅に増加され、不良品の発生はほぼ全面的に回避される。凹部36内に挿入されてろう接される仕切部35を介しての洩れは、ほぼ確実に発生しないと考えてよい。

【0019】次に、熱交換器の第2の実施例を図8を参照して説明する。ただし、上記第1の実施例の熱交換器と同一構成のものについては同一符号を付してその説明を省略し、以下、異なる点についてのみ説明する。

【0020】この第2の実施例に係る熱交換器が第1の実施例に係るものと相違する点は、タンク部材4の仕切部35とキャップ5との接合部において、その接合部のろう接の強化を図ったところにある。

【0021】すなわち、上記第1の実施例に係る熱交換器は、キャップ5によりタンク部材4の開口部を塞ぐ構成であるが、キャップ5とタンク部材4の仕切部35とのろう付け接合が良好に行われないと、そこから入口タンク33と出口タンク34との間に洩れが生ずる可能性があり、そのろう接不良を回避するのがこの実施例である。

【0022】具体的には、タンク部材4の仕切部35の側端部にろう接不良防止片45、45を突出形成すると共に、このろう接不良防止片45、45に対応する各キャップ5、5の所定位置に、該ろう接不良防止片45、45を挿入する凹部46を形成している。

【0023】この構成によれば、キャップ5を被せたタンク部材4は、その仕切部35のろう接不良防止片45、45がキャップ5の凹部46内に挿入され、しかる後にろう付けがなされるから、仕切部35とキャップ5との間はろう付け不良が起らない。これにより、キャップ5を介しての洩れは回避されるものである。なお、その他の構成は第1の実施例と同様であるので、その説明は省略する。

【0024】なお、図9及び図10に、タンク部材4のパイプ挿入孔29、29の周縁の所定位置に、タンク内部に向けて複数のパイプ支持片48を突出した例が示されている。この構成によれば、タンク6に設けられる出入口パイプ3、3は、パイプ支持片48に支持され、位置決め固定が容易に行なわれるという利点を有している。なお、このパイプ支持片48の数は適宜に設定されると共に、周縁全体に環状に形成したものであっても良い。

【0025】次に、熱交換器の第3の実施例を図11を

参照して説明する。ただし、上記第1及び第2の実施例の熱交換器と同一構成のものについては、同一符号を付してその説明を省略し、以下、異なる点についてのみ説明する。

【0026】この第3の実施例に係る熱交換器が、第1及び第2の実施例に係るものと相違する点は、タンク6を構成するタンク部材4を押出成形により構成したところにある。

【0027】すなわち、タンク部材4は、押出成形により形成されたものであるから、エンドプレート面27及び仕切面（これは仕切部35と同じである）31は一体に成形されることは勿論であるが、仕切部35の上端部及び下端部のいずれにもろう接箇所がないという点で、上記第1及び第2の実施例に係るタンク部4と異なったものとなっている。

【0028】従って、上記第1及び第2の実施例に対し、仕切部35のろう接を行なう凹部36を設けないという点において利点を有し、タンク部材4のみを考えると、完全に洩れが生じない構成となっている。なお、上記第1及び第2の実施例は、タンク部材4をプレス成形によって構成できる点において、利点を有する。

【0029】しかしながら、キャップ5を被せるという点において相違はなく、キャップ5を介するタンク洩れを第2の実施例と同様に考慮する必要がある。

【0030】この点については、上述の第2の実施例と同様に、仕切部35の側端部にろう接不良防止片45を突出形成すると共に、このろう接不良防止片45に対応するキャップ5、5の所定位置に、該ろう接不良防止片45を挿入する凹部46を設けた構成としている。

【0031】したがって、キャップ5を被せたタンク部材4は、その仕切部35のろう接不良防止片45がキャップ5の凹部46内に挿入され、しかる後ろう付けがなされるから、上記第2の実施例と同様に、仕切部35とキャップ5との間にはろう付け不良が起こらない。これにより、キャップ5を介してのタンク洩れは回避されることとなり、上記第2の実施例と同様の作用効果を有する。なお、その他の点は、上記第1の実施例と同様である。

【0032】

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*【発明の効果】以上述べたように、この発明によれば、エンドプレート面及び仕切部をタンクに一体成形し、ろう接箇所を仕切部の端部のみとしたものであり、この仕切部の端部を所定位置に設けた凹部に挿入して面接合によりろう付けを行うものであるから、接合箇所が最小限に抑えられると共に、面接合によって確実にろう付けがなされ、もってろう付け不良の発生率が大幅に低減されるものである。これにより、タンク洩れをほぼ確実に防止することができ、不良品の発生率が大幅に削減され、熱交換器の信頼性が向上される。また、従来品に比して、タンクの成形及び組み付け性が良いという利点も有する。

【図面の簡単な説明】

【図1】第1の実施例に係る熱交換器の斜視図である。

【図2】成形プレートの平面図である。

【図3】図1のA-A線断面の拡大図である。

【図4】第1の実施例に係るタンク部材の一部破展開図である。

【図5】同上のタンク部材の一部破斜視図である。

【図6及び図7】要部の拡大断面図である。

【図8】第2の実施例に係る熱交換器のタンク部材及びキャップを示した分解斜視図である。

【図9及び図10】同上の熱交換器のタンク部材の一部変更例を示す図である。

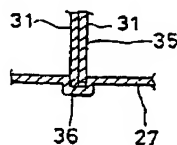
【図11】第3の実施例に係る熱交換器のタンク部材及びキャップを示した分解斜視図である。

【符号の説明】

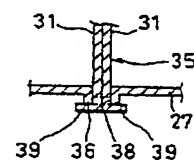
- 1 チューブエレメント
- 2 フィン
- 3 出入口パイプ
- 4 タンク部材
- 5 キャップ
- 6 タンク
- 27 エンドプレート面
- 35 仕切部
- 36 凹部（エンドプレート面側）
- 45 ろう接不良防止片
- 46 凹部（キャップ側）

*

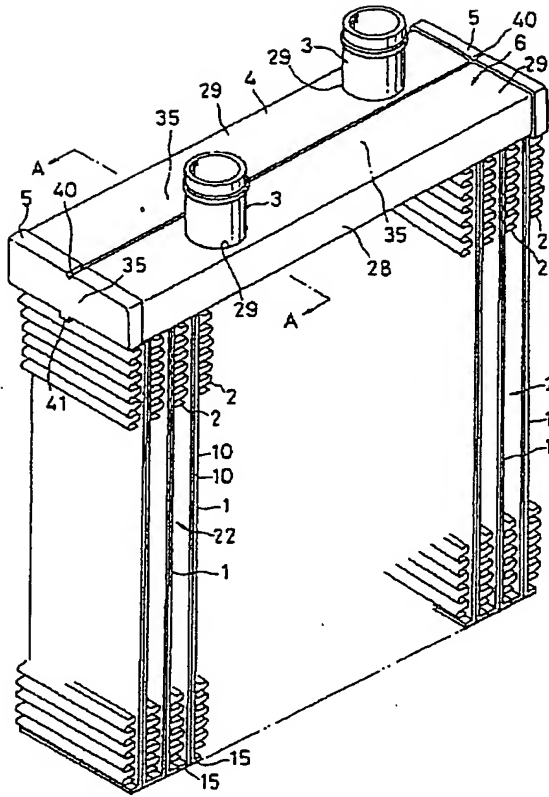
【図6】



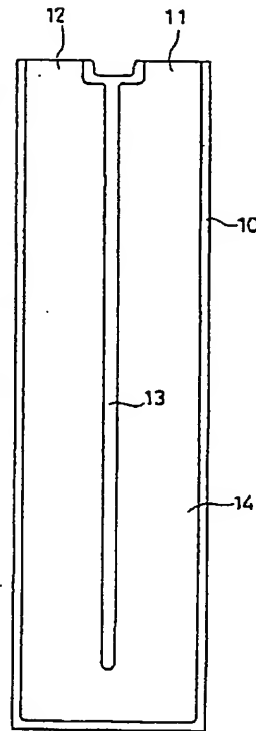
【図7】



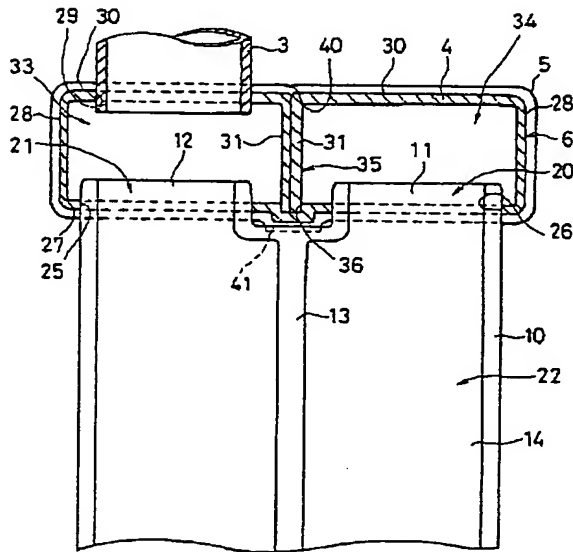
【図1】



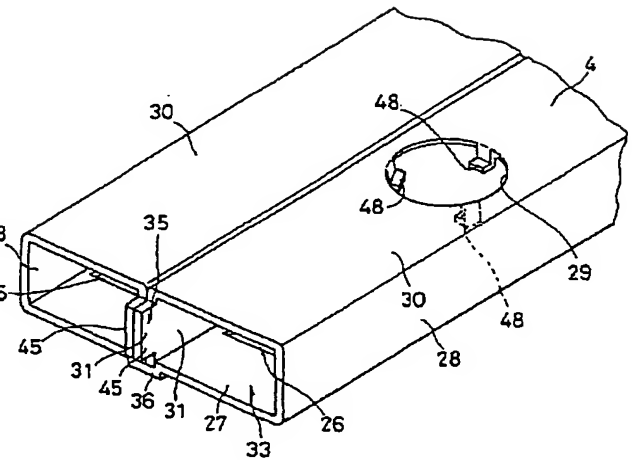
【図2】



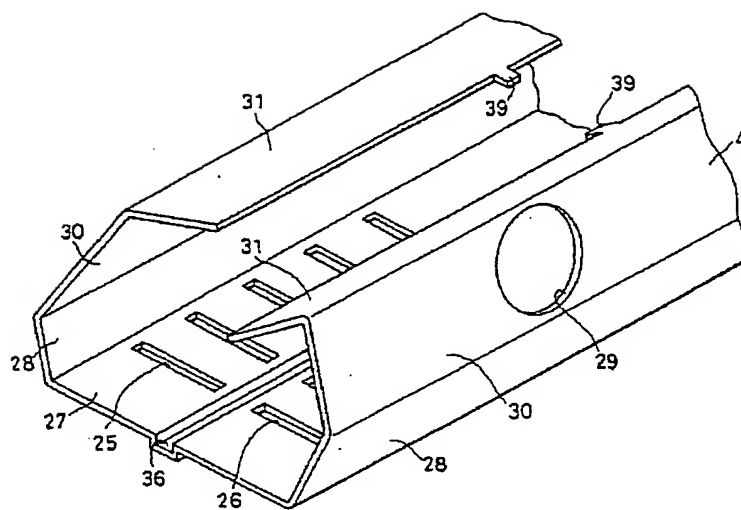
【図3】



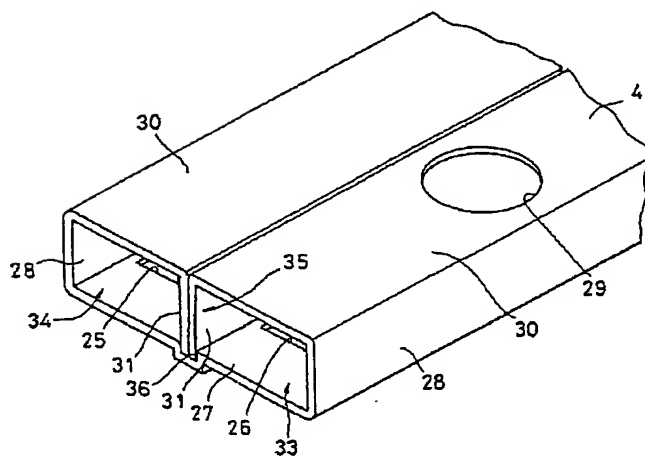
【図9】



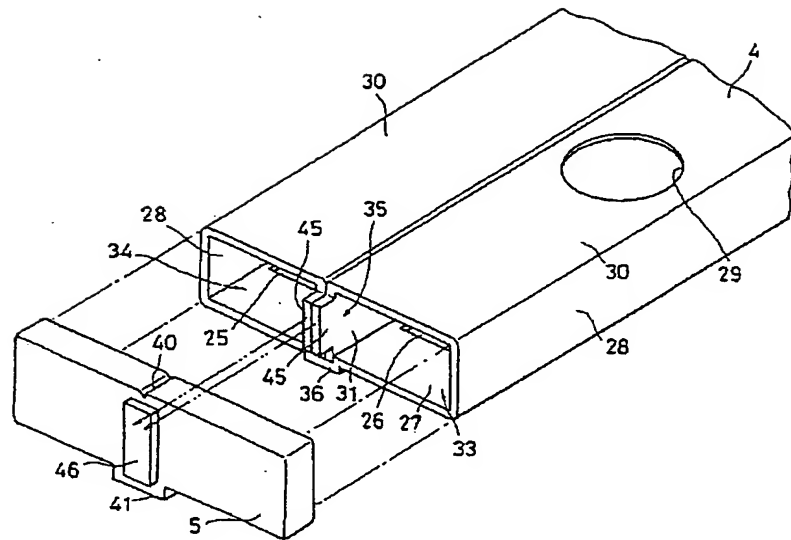
【図4】



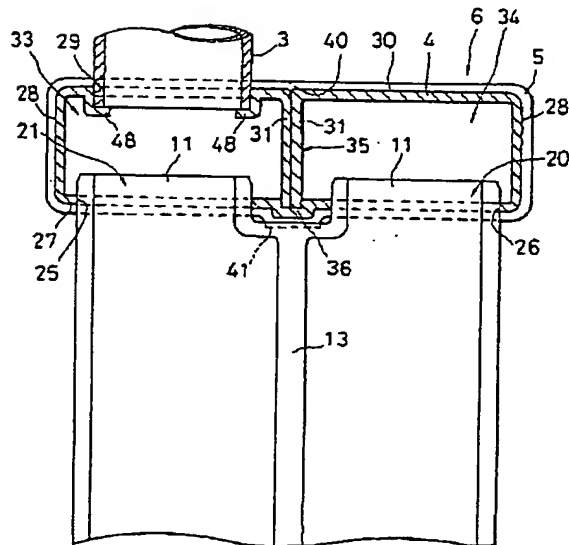
【図5】



【図8】



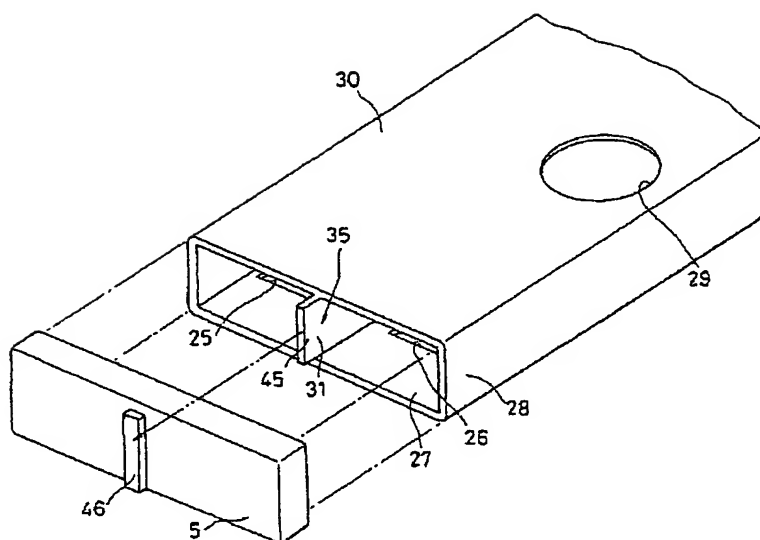
【図10】



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【図11】



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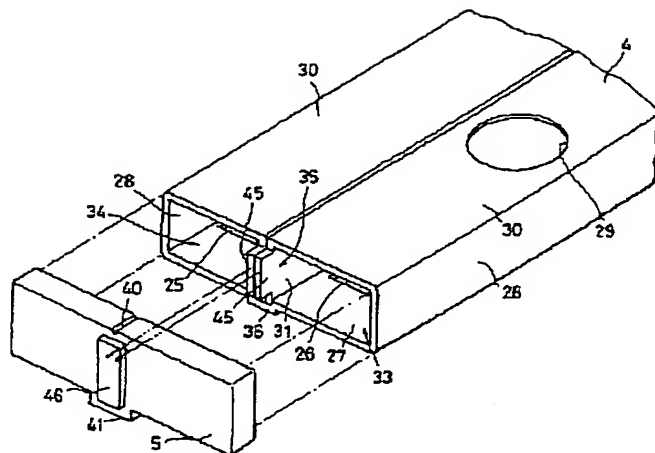
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APPLICATION NUMBER : 03267109

APPLICANT : ZEXEL CORP;

INVENTOR : SUGITA TAKASHI;

INT.CL. : F28F 9/02 F25B 39/00

TITLE : HEAT EXCHANGER



ABSTRACT : PURPOSE: To sufficiently prevent leakage of a tank by so composing the tank that the connecting part (brazing part) of the tank is minimized.

CONSTITUTION: A tank is composed of a tank member 4 in which an end plate 27 is integrally molded with a partition 35, and a cap 5. Recesses 36, 46 for inserting the end and the side of the partition 35 are provided at predetermined positions (the end plate 27 of the member 4 and substantially center of the cap 5) of the tank corresponding to the ends (end and the side) of the partition 35 of brazing positions of necessary minimum limit of the member 4.

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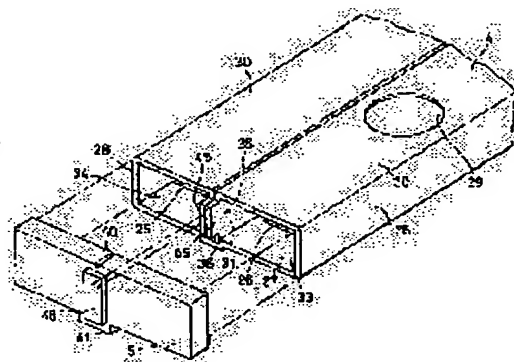
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(54) HEAT EXCHANGER

(57)Abstract:

PURPOSE: To sufficiently prevent leakage of a tank by so composing the tank that the connecting part (brazing part) of the tank is minimized.

CONSTITUTION: A tank is composed of a tank member 4 in which an end plate 27 is integrally molded with a partition 35, and a cap 5. Recesses 36, 46 for inserting the end and the side of the partition 35 are provided at predetermined positions (the end plate 27 of the member 4 and substantially center of the cap 5) of the tank corresponding to the ends (end and the side) of the partition 35 of brazing positions of necessary minimum limit of the member 4.



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CLAIMS

[Claim(s)]

[Claim 1] Two or more step laminating of the tube element which has the heat exchange medium path of the letter of the abbreviation for U characters is carried out through a fin. It is the heat exchanger which connects the tank of another object which supplies a heat exchange medium, and grows into the end side of the tube element by which the laminating was carried out. Said tank The end-plate side which inserts the entrance of a tube element, and the tank member of 1 member configuration with which the batch section which divides the interior of a tank is really fabricated, The heat exchanger characterized by having been constituted by the cap which blockades opening of this tank member, having inserted the edge of this batch section in the predetermined location of the end-plate side of the tank corresponding to the edge of said batch section, and preparing the crevice which carries out brazing and soldering.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the heat exchanger mainly used for the air conditioner for cars.

[0002]

[Description of the Prior Art] A heat exchanger in recent years attains the miniaturization of a tank, and is becoming in use [what forms a tank in another object and changes] as shown in JP,63-154962,U.

[0003] It was what the tank concerning the above-mentioned advanced technology joins the end plate which inserts the entrance of a tube element, and the tank member which has an entrance pipe, is constituted, inserts the junction in the crevice which established each edge (the edge of the batch section which divides the interior of a tank is included) of a tank member in the end plate, and carries out soldering immobilization.

[0004]

[Problem(s) to be Solved by the Invention] However, the amount of [of a tank member and an end plate] joint on the tank concerning the above-mentioned advanced technology, for this reason, it smells by each joint, and would shine, a defect tended to happen, and it had the fault of being easy to generate the leak of a tank.

[0005] Then, in view of the above-mentioned trouble, this invention constitutes a tank so that it may become the minimum as much as possible about a part for the joint of a tank (brazing-and-soldering part), and it aims at offering the heat exchanger planned so that the leak of a tank could fully be prevented.

[0006]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the heat exchanger concerning this invention Two or more step laminating of the tube element which has the heat exchange medium path of the letter of the abbreviation for U characters is carried out through a fin. It is the heat exchanger which connects the tank of another object which supplies a heat exchange medium, and grows into the end side of the tube element by which the laminating was carried out. Said tank The end-plate side which inserts the entrance of a tube element, and the tank member of 1 member configuration with which the batch section which divides the interior of a tank is really fabricated, It is constituted by the cap which blockades opening of this tank member, and the edge of this batch section is inserted in the predetermined location of the tank corresponding to the edge of said batch section, and the crevice which carries out brazing and soldering is established in it.

[0007]

[Function] Therefore, it is the thing which includes an end plate side for a tank member and by which material constitutes, the brazing and soldering part of this tank member is use only as the edge of the really fabricated batch section, a part for a joint is stop to the minimum, and will shine since [part] I will establish the crevice which inserts this in the predetermined location of a tank, I will shine and it touches, a defect incidence rate is sharply reduce, and the above-mentioned technical problem is solve by this.

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[0008]

[Example] Hereafter, a drawing explains the example of this invention.

[0009] In drawing 1 thru/or drawing 3 , a heat exchanger carries out two or more step laminating of the tube element 1 and the corrugated fin 2 by turns, to the tank member 4 which has the entrance pipes 3 and 3 for the entrance side of the tube element 1 by which the laminating was carried out, while carrying out insertion immobilization, caps 5 and 5 close opening of the both ends of this tank member 4, a tank 6 is constituted from these caps 5 and 5 and a tank member 4, and they are ***** with a group.

[0010] The tube element 1 joins two shaping plates 10 which carry out the following to midst doubling, and is constituted (the so-called lamination type of thing). In addition, you may be not only this but the thing which carried out extrusion molding, and the flat tube which made the pipe the shape of flat.

[0011] The shaping plate 10 which constitutes said tube element 1 While it is an abbreviation rectangle-like thing as shown in drawing 2 , and projecting and bulge forming the crevices 11 and 12 for an entrance section configuration of a heat exchange medium at the end side A protruding line 13 is installed towards an other end side from between these crevices 11 and 12 for an entrance section configuration, and bulge formation of the crevice 14 for a heat exchange medium path configuration of the letter of the abbreviation for U characters which leads to the periphery of this protruding line 13 in said crevices 11 and 12 for an entrance section configuration is carried out. Moreover, ups-and-downs formation of the tube element striking portion 15 is mostly carried out towards the method of outside at the other end side of this shaping plate 10 at the right angle.

[0012] The tube element 1 consists of joining this shaping plate 10 to two-sheet midst doubling, and the entrances 20 and 21 of a heat exchange medium consist of crevices 11 and 12 for an entrance section configuration which face, and while the heat exchange medium path 22 of the letter of the abbreviation for U characters consists of crevices 14 for a heat exchange medium path configuration which face, said entrances 20 and 21 are open for free passage [that interior] in that end side, through the heat exchange medium path 22.

[0013] The tube element 1 of this structure arranges a fin 2 on the heat exchange side of the tube element of between each tube element by which each tube element striking portion 15 was made to contact, two or more step laminating was carried out, and the laminating was carried out between the tube elements which adjoin as shown in drawing 1 , and the direction both ends of a laminating. And insertion immobilization of each entrances 20 and 21 of this tube element 1 by which the laminating was carried out is carried out at the tube element insertion sections 25 and 26 of the tank member 4 which carries out the following.

[0014] Press forming of the one aluminium alloy plate is carried out, and the tank member 4 is constituted, as it is the box-like thing prolonged in the direction of a laminating of a tube element, for example, is shown in drawing 4 and drawing 5 . The end-plate side 27 which drilled two or more tube element insertion sections 25 and 26 in which this tank member 4 inserts the entrances 20 and 21 of the tube element 1, It has the Tanggu sides 28 and 28, the tank top faces 30 and 30 in which the pipe insertion holes 29 and 29 for inserting the entrance pipes 3 and 3 were formed, and the batch sides 31 and 31 which constitute the batch section 35 which divides the tank 6 interior, and each field is bent at an abbreviation right angle inside, respectively, and it is constituted. And while the contacted batch sides 31 and 31 constitute the batch section 35 which divides the tank 6 interior into the inlet-port tank (or outlet tank) 33 and the outlet tank (or inlet-port tank) 34, insertion immobilization of the point of this batch section 35 is carried out in the crevice 36 formed in the end-plate side 27 (refer to drawing 6). In addition, in this example, drill notching 38 in the predetermined location of the crevice 36 of the end-plate side 27, insert the pieces 39 and 39 of engagement projected and formed in the interior of this notching 38 at the tip of the batch sides 31 and 31, these pieces 39 and 39 of engagement are made to bend outside, as shown in drawing 7 , and it is considering as the structure where engagement insertion of the tip of the batch section 35 is certainly carried out into a crevice 36 by this. Opening of the both ends of this tank member 4 is blockaded with the caps 5 and 5 which carry out the following, and a tank 6 consists of this tank member 4 and caps

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5 and 5.

[0015] Caps 5 and 5 are for blockading opening of the both ends of a tank 6, and they are put on the both ends of the tank member 4, and it is equipped with them. And while the projection 40 for filling the clearance between the plane-of-composition upper parts of the batch section 35 of the tank member 4 is projected and formed in the center of up abbreviation of these caps 5 and 5 towards the inside, the crevice stowage 41 for inserting the crevice 36 of the tank member 4 is formed in the center of lower abbreviation.

[0016] In addition, insertion immobilization of the entrance pipes 3 and 3 is carried out at the pipe insertion holes 29 and 29 of the tank member 4, and these entrance pipes 3 and 3 are opened for free passage by the inlet-port tank 33 of a tank 6, and the outlet tank 34, respectively.

[0017] Wax material is manufactured by the outside of the aluminium alloy plate which is the configuration member and with which a shaping plate, a tank member, a cap, etc. make aluminum the charge of a principal member, for example with the clad plate by which the clad was carried out, and it is fixed with a fixture, and is soldered all over a furnace, and the heat exchangers of this configuration are **** with a group. and the heat exchange medium which flowed into the inlet port tank 33 from one entrance pipe 3 flow the inside of the heat exchange medium path 22 of each tube element 1, and be bring together in nothing and the outlet tank 34 in heat exchange between external air in the meantime, and this heat exchanger be discharge from the entrance pipe 3 of another side (or follow a reverse path) — it be like .

[0018] The tank 6 of this heat exchanger that configuration member a part However, the tank member 4 of a material configuration, Only the caps 5 and 5 which plug up the opening constitute, and the brazing-and-soldering part of this tank member 4 is used only as the point of the batch section 35. Since it fixes by inserting into the crevice 36 of formation of the point of this batch section 35 to the end-plate side 27, and shining, a brazing-and-soldering part is the minimum and the poor brazing and soldering of a tank 6 can be prevented to the maximum extent. Thereby, since the incidence rate of poor brazing and soldering can be stopped to the minimum, the productivity of an excellent article is increased very sharply and generating of a defective is avoided almost extensively. You may think that the leak through the batch section 35 which is inserted into a crevice 36 and will shine and which is touched is not generated almost certainly.

[0019] Next, the 2nd example of a heat exchanger is explained with reference to drawing 8 . However, the same sign is attached about the thing of the same configuration as the heat exchanger of the 1st example of the above, the explanation is omitted, and only a different point is explained hereafter.

[0020] The point that the heat exchanger concerning this 2nd example is different from the thing concerning the 1st example is in the place which strengthened the brazing and soldering of that joint in the joint of the batch section 35 of the tank member 4, and cap 5.

[0021] That is, although the heat exchanger concerning the 1st example of the above is a configuration which plugs up opening of the tank member 4 with cap 5, if it curses with cap 5 and the batch section 35 of the tank member 4 and junction is not performed good, a leak may arise from there between the inlet-port tank 33 and the outlet tank 34, and this example will avoid that poor brazing and soldering.

[0022] While projecting and forming the pieces 45 and 45 of poor brazing-and-soldering prevention in the side edge section of the batch section 35 of the tank member 4, specifically, the crevice 46 which inserts these pieces 45 and 45 of poor brazing-and-soldering prevention is formed in the predetermined location of each caps 5 and 5 corresponding to these pieces 45 and 45 of poor brazing-and-soldering prevention.

[0023] According to this configuration, since the pieces 45 and 45 of poor brazing-and-soldering prevention of that batch section 35 are inserted into the crevice 46 of cap 5 and soldering is made by after an appropriate time, as for the tank member 4 which put the cap 5, poor soldering does not take place between the batch section 35 and cap 5. Thereby, the leak through cap 5 is avoided. In addition, since other configurations are the same as that of the 1st example, the explanation is omitted.

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[0024] In addition, the example which projected two or more pieces 48 of pipe support towards the interior of a tank at drawing 9 and drawing 10 in the predetermined location of the periphery of the pipe insertion holes 29 and 29 of the tank member 4 is shown. According to this configuration, the entrance pipes 3 and 3 prepared in a tank 6 are supported by the piece 48 of pipe support, and have the advantage that positioning immobilization is performed easily. In addition, the number of these pieces 48 of pipe support may be annularly formed in the whole periphery while it is set up suitably.

[0025] Next, the 3rd example of a heat exchanger is explained with reference to drawing 11. However, about the thing of the same configuration as the heat exchanger of the 1st and 2nd examples of the above, the same sign is attached, the explanation is omitted, and only a different point is explained hereafter.

[0026] The point that the heat exchanger concerning this 3rd example is different from the thing concerning the 1st and 2nd examples is in the place which constituted the tank member 4 which constitutes a tank 6 by extrusion molding.

[0027] That is, since the tank member 4 is formed of extrusion molding, although the end-plate side 27 and the batch side (this is the same as the batch section 35) 31 of being fabricated by one are natural, it is a different thing from the tank section 4 concerning the 1st and 2nd examples of the above in that there is no brazing-and-soldering part in both the upper limit section of the batch section 35, and the lower limit section.

[0028] Therefore, if it has an advantage in the point of not forming the crevice 36 which performs the brazing and soldering of the batch section 35 to the 1st and 2nd examples of the above and only the tank member 4 is considered, it has composition which a leak does not produce completely. In addition, the 1st and 2nd examples of the above have an advantage in the point which can constitute the tank member 4 by press forming.

[0029] However, in the point of putting cap 5, there is no difference and it needs to consider the tank leak through cap 5 as the 2nd example similarly.

[0030] About this point, like the 2nd above-mentioned example, while projecting and forming the piece 45 of poor brazing-and-soldering prevention in the side edge section of the batch section 35, it is considering as the configuration which established the crevice 46 which inserts this piece 45 of poor brazing-and-soldering prevention in the predetermined location of the caps 5 and 5 corresponding to this piece 45 of poor brazing-and-soldering prevention.

[0031] Therefore, since the piece 45 of poor brazing-and-soldering prevention of the batch section 35 is inserted into the crevice 46 of cap 5 and soldering is made after an appropriate time, as for the tank member 4 which put the cap 5, between the batch section 35 and cap 5, poor soldering does not take place like the 2nd example of the above. Thereby, the tank leak through cap 5 will be avoided and has the same operation effectiveness as the 2nd example of the above. In addition, other points are the same as the 1st example of the above.

[0032]

[Effect of the Invention] As stated above, according to this invention, an end-plate side and the batch section are really fabricated on a tank. Since a brazing-and-soldering part is used only as the edge of the batch section, it inserts in the crevice which established the edge of this batch section in the predetermined location and it solders by field junction, while a junction part is suppressed to the minimum. By field junction, soldering is made certainly, it has, and the incidence rate of poor soldering is reduced sharply. By this, a tank leak can be prevented almost certainly, the incidence rates of a defective are reduced sharply, and the dependability of a heat exchanger improves. Moreover, as compared with elegance, shaping of a tank and attachment nature also have conventionally the advantage of being good.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the perspective view of the heat exchanger concerning the 1st example.

[Drawing 2] It is the top view of a shaping plate.

[Drawing 3] It is the enlarged drawing of the A-A line cross section of drawing 1 .

[Drawing 4] a part of tank member concerning the 1st example — it is *****.

[Drawing 5] a part of tank member same as the above — it is *****.

[Drawing 6 and drawing 7] It is the expanded sectional view of an important section.

[Drawing 8] It is the decomposition perspective view having shown the tank member of a heat exchanger and cap concerning the 2nd example.

[Drawing 9 and drawing 10] It is drawing showing the example of a partial change of the tank member of a heat exchanger same as the above.

[Drawing 11] It is the decomposition perspective view having shown the tank member of a heat exchanger and cap concerning the 3rd example.

[Description of Notations]

1 Tube Element

2 Fin

3 Entrance Pipe

4 Tank Member

5 Cap

6 Tank

27 End-Plate Side

35 Batch Section

36 Crevice (End-Plate Side Side)

45 Piece of Poor Brazing-and-Soldering Prevention

46 Crevice (Cap Side)

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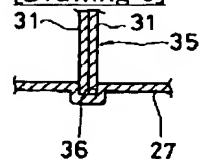
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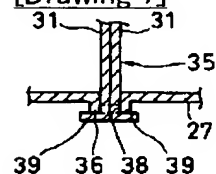
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DRAWINGS

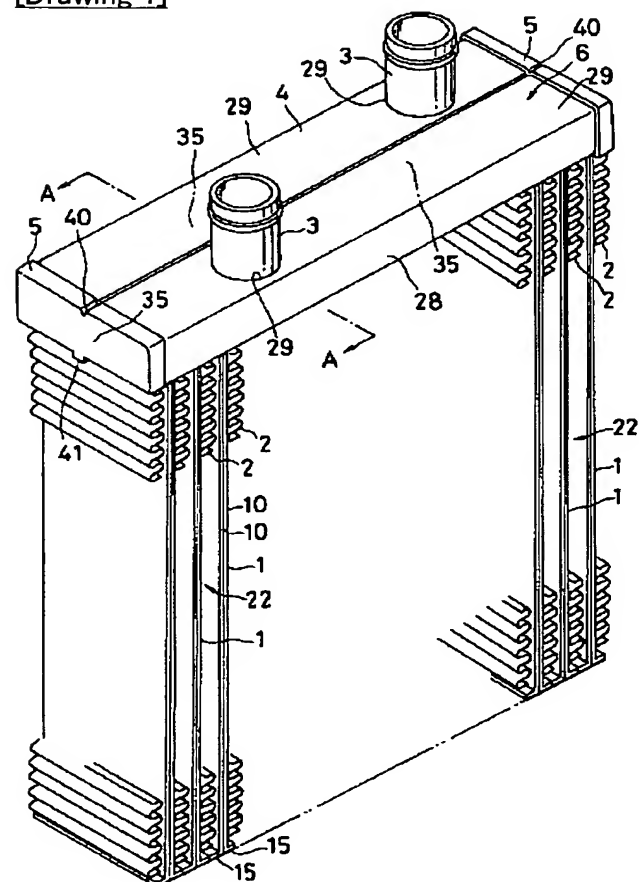
[Drawing 6]



[Drawing 7]

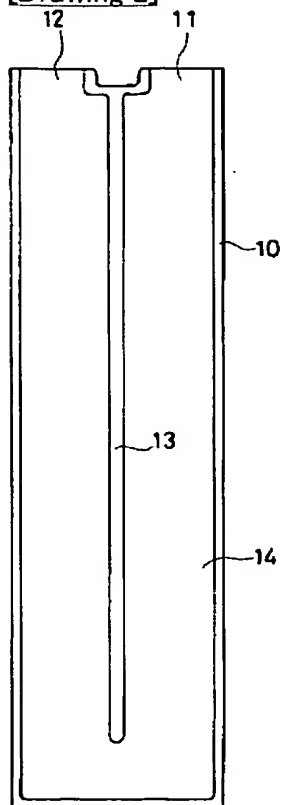


[Drawing 1]

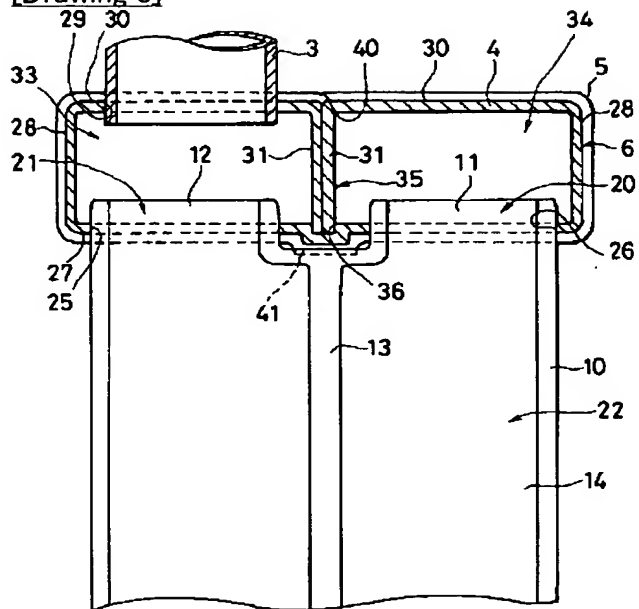


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[Drawing 2]

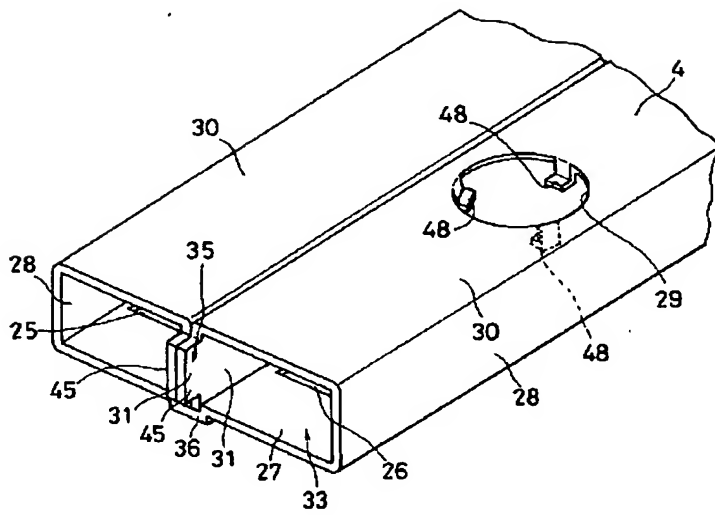


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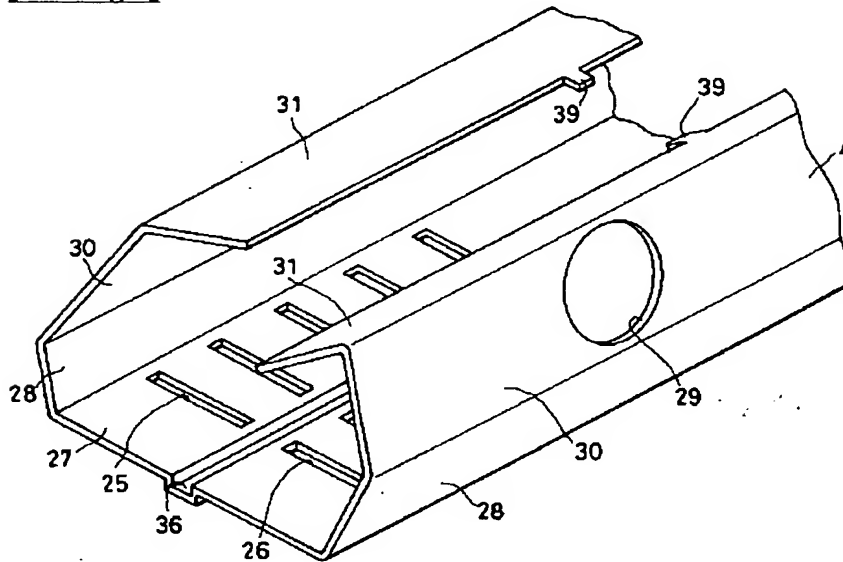


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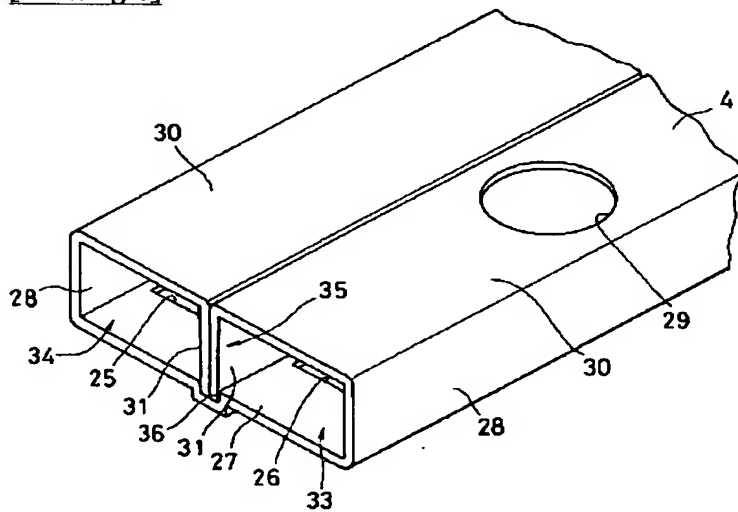
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[Drawing 4]

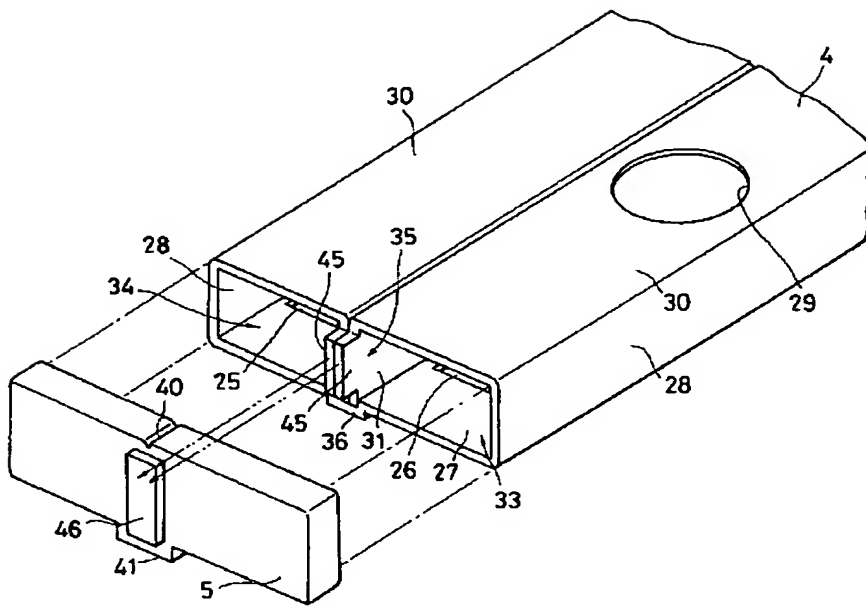


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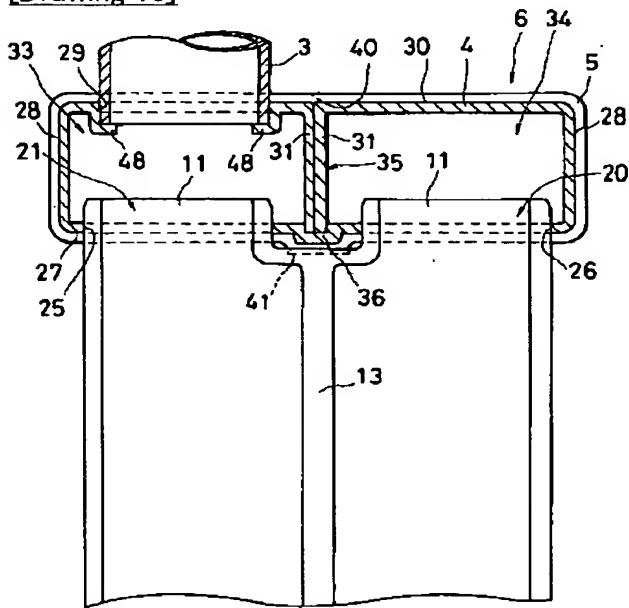


[Drawing 8]

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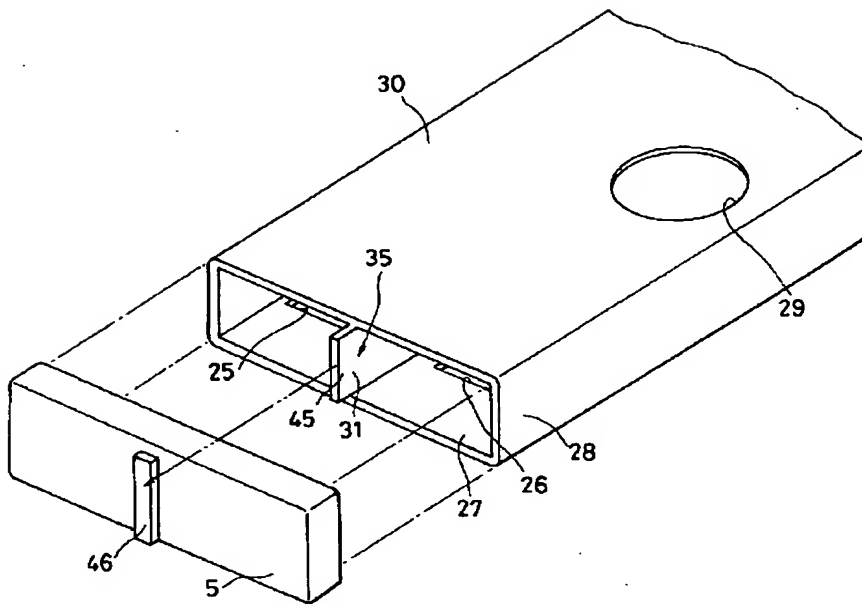


[Drawing 10]



[Drawing 11]

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